Topic: To quantify the response of thermospheric density and composition to solar and high latitude forcing.

Project Title:
Quantification of the Thermospheric Density Response to Solar Forcing

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Project Information:
The response of thermospheric densities to variable solar energy inputs in the ultraviolet and X-ray spectral regions will be studied using a general circulation model of the thermosphere-ionosphere system, and measurements of solar irradiance from several space-based instruments. Calculated densities at different geophysical conditions and locations, using measured solar irradiance as input to the model, will be compared to an extensive database of measured densities obtained from long-term changes of multiple satellite orbits due to atmospheric drag. The general circulation model physical processes and boundary conditions will be examined and adjusted to obtain agreement with the density measurements and with empirical models. Results of this research will be communicated at community model development workshops as well as in the journal literature. These studies will result in an improved understanding of short-term and solar cycle modulation of thermospheric density, and a more quantitative basis for long-term studies of possible secular change in the upper atmosphere due to cooling induced by anthropogenic gases.

ROSES ID: NRA-NNH04ZSS001N
Duration:
Selection Year: 2005
Program Element: Focused Science Topic

Citations: